PROCEEDINGS

OF

THE ROYAL SOCIETY.

1832–1833. No. 14.

November 21, 1833.

JOHN WILLIAM LUBBOCK, Esq., M.A., V.P. and Treasurer, in the Chair.

A paper was read, entitled, "Historical Notice to the supposed Identity of the large mass of Meteoric Iron now in the British Museum, with the celebrated Otumpa Iron described by Rubin de Celis, in the Philosophical Transactions for 1786." Communicated in a letter from Woodbine Parish, jun., Esq., F.R.S., to Charles Konig, Esq., Foreign Secretary of the Royal Society.

The mass of iron in question was transmitted to Buenos Ayres, for the purpose of being manufactured into fire-arms, at the period when the people of that country declared themselves independent of Spain; but a supply of arms having in the meanwhile arrived, it was deposited in the Arsenal, and afterwards given to Mr. Parish, who transmitted it to England. Its identity with the mass of iron described by De Celis, though probable, is not exactly determined.

A paper was also read, entitled, "Observations of Nebulæ and Clusters of Stars, made at Slough, with a Twenty-feet Reflector, between the Years 1825 and 1833." By Sir John F. W. Herschel, K.H., F.R.S.

This paper contains the results of observations begun in 1825, and assiduously prosecuted till the commencement of the present year, for the purpose of reviewing the nebulæ and clusters of stars discovered by his father, the late Sir William Herschel, and also of extending his discoveries, and enlarging our knowledge of the nature and physical constitution of those remarkable and mysterious bodies. Since the recent improvements in the achromatic telescope, and the increased diligence of astronomers in surveying every part of the heavens, and detecting the passage of comets, the want of an extensive list of nebulæ has become continually more urgent; and hence the author was induced to supply, as far as he was able, that deficiency, which he has now attempted by simply stating the results of his own observations, in preference to waiting until he could present them to the Society in the more complete form of a general catalogue of nebulæ and clusters visible in this latitude. All the observations here given have been reduced to a common epoch, and arranged in the

order of right ascension: and in every case where the same object was observed more than once, all the observations relating to it have been collected together; by which means they not only can be used as a catalogue for reference, but each result carries with it its own weight and evidence.

Great and various are the difficulties attending inquiries of this nature. Many of the nebulæ present a surface so large and ill defined, that it is not always easy to determine where the centre of greatest brightness is situated. Vast numbers of the nebulæ, indeed, are so extremely faint, as to be with difficulty perceived, till they have been some time in the field of vision, or are even just about to quit it; so that the observations become hurried and uncertain. In those parts of the heavens where they are most crowded, their prodigious number, as well as their variety, and the interest they excite, render it scarcely possible to proceed with that methodical calmness and regularity which are necessary to ensure numerical correctness. It is also to be recollected, that it is only during the months of March, April, and May, that the richer parts of the heavens can be advantageously observed, and then only in the complete absence of the moon and of twilight. From all these causes conjoined, it will be readily understood, that a much greater latitude of error is incident to observations of nebulæ than to those of stars.

The observations registered in this paper comprise 2500 nebulæ and clusters of stars,—a number equal to that of those observed by Sir William Herschel: only about 2000, however, are common to both collections, the remaining 500 of the author's being new. Of these last, by far the greater proportion are objects of the last degree of faintness, only to be seen with much attention, and in good states both of the atmosphere and the telescope. The author generally made a sketch of any remarkable nebula that presented itself; and these drawings accompany the paper. Among these are representations of some very extraordinary objects, which have not hitherto sufficiently engaged the attention of astronomers, and many of which possess a symmetry of parts, and a unity of design, strongly marking them as systems of a definite nature, each complete in itself, and subservient to some distinct, though to us inscrutable, purpose.

In an Appendix, the author enters into a detailed account of the manner in which the reductions have been executed, and how the numbers set down in the catalogue are concluded from those registered at the moment of observation. For effecting these reductions, he pursued a method materially different, and much more convenient and exact, than he employed to reduce his earlier catalogue of double stars.

Various remarks are next made on the figured nebulæ. It often occurred to the author, to notice a peculiar state of the atmosphere, which is quite independent of fog or haziness, in which all large stars above the seventh magnitude appear surrounded with photospheres, of a diameter of two or three minutes, or even more, and exactly resembling those about some of the finer specimens of nebulous stars. These appearances come on suddenly, seldom last long, and disap-

pear as unexpectedly as they come: hence the inference is drawn, that the true cause of this phenomenon is atmospheric, and that it is perhaps connected with some highly rarefied material, disseminated in cloud-like, though invisible, masses in the very highest regions of our atmosphere, and possibly the same with that which, when ignited by the passage of electric currents, gives rise to many, if not all, the phenomena of the aurora borealis. Frequent instances occur of the proximity of minute stars to nebulæ; an appearance which naturally suggests the idea of their composing planetary systems: for the enormous magnitude of the nebulæ, and its consequent probable mass, may, notwithstanding the rarity of its material, give it a gravitating energy, capable of retaining, in orbits three or four times their own diameter, and in periods of great length, small bodies of a star-like character.

Lastly, the author offers some remarks on the constitution of nebulæ which have an elongated or elliptical form, of those which are double, and of those to which the epithets of *hairy* or *filamentous* have been applied; and considers their relations to ordinary physical laws.

Anniversary Meeting, Nov. 30th, 1833.

HIS ROYAL HIGHNESS THE DUKE OF SUSSEX, K.G., President, in the Chair.

The President delivered the following Address:

GENTLEMEN,

THE third anniversary of my election to this Chair affords me again the opportunity of expressing my grateful thanks for the kindness which I have continued to receive from you. I would willingly enlarge upon a topic which is so grateful to my feelings, were I not conscious that by so doing I should merely vary the form of phrases which the natural expression of my sentiments prompted me to use when I have before had the pleasure of addressing you, whilst the sentiments themselves remain not merely unchanged, but, I trust, likewise unchangeable. If I am thus brief, therefore, Gentlemen, in the public declaration of my acknowledgements, from a fear of being tedious by their too frequent repetition, I hope that you will not upon that account consider them the less sincere, or that the long experience which I have had of your support and co-operation has made me less sensible of their value.

When I last had the honour of addressing you, it was a source of pride and happiness to me to be empowered to announce to you the gracious intentions of His Majesty to continue to the Royal Society the Annual Grant of two Gold Medals, which had been previously conferred on the Royal Society by his Royal Predecessor.

It must be well known to you, Gentlemen, that these Royal Medals were not adjudged during the two first years that I presided over the Royal Society; and as there exist many circumstances con-

nected with the original grant and distribution of those Medals, as well as causes leading to their temporary discontinuance, with which the Fellows may not be generally acquainted, I trust that I may be allowed to enter into some details respecting them.

His late Majesty King George the Fourth announced, towards the close of the year 1825, through the medium of the Secretary of State for the Home Department (Sir Robert Peel), his gracious intention of founding two Gold Medals, of the value of Fifty Guineas each, to be annually awarded as honorary premiums, under the direction of the President and Council of the Royal Society, in such a manner as should, by the excitement of competition among men of science, seem best calculated to promote the objects for which the Royal Society was originally instituted. This munificent gift of the Patron of the Royal Society was of course accepted by the President and Council with every expression of gratitude for so valuable an addition to their means of promoting the interests of science; and it was resolved that, in conformity with His Majesty's Commands, the Royal Medals should be adjudged for the most important discoveries or series of investigations completed and made known to the Royal Society in the year preceding the day of their award; that their presentation should not be limited to British subjects; and that His Majesty's effigy, if such should be the Sovereign's pleasure, should form the obverse of the Medals; and that two Medals from the same die should be struck upon each foundation, one of gold and the other of silver.

Upon proceeding to the distribution of the Medals, it was found that the limitation of time which these Resolutions fixed was of such a nature as to interfere most materially with the proper observance of the object proposed to be secured by their foundation; and the period was therefore, with His Majesty's sanction, extended to five years: in accordance with this arrangement the Medals continued to be awarded until the year 1830, inclusive, when the demise of His late Majesty took place, and in which year I had the honour of being elected to fill the Chair of the Royal Society.

Mr. Chantrey, to whom, in conjunction with Sir Thomas Lawrence, was intrusted the selection of the subject for the Medal, furnished the cast for the medallion of the head of His late Majesty, which was to form the obverse of it, while Sir Thomas undertook to compose the design for the reverse. Unfortunately, that distinguished artist, either from over-delicacy or over-anxiety to produce a work of art worthy of the object for which it was intended, or from that spirit of procrastination which was unhappily too common with him, delayed its execution from year to year, and died without leaving behind him even a sketch of his ideas respecting it, though the character of such a design as would be at once classical and appropriate to the purpose, was the subject of frequent conversation, and even of favourite speculation with him. From these and other causes, to which it is not necessary for me now to advert, it arose, that, at the demise of His late Majesty, although the adjudication of ten Medals had been formally made and announced from the Chair

of the Royal Society, not even the dies, much less the Medals, were forthcoming for the purpose of distribution to the various distinguished persons, some of them foreigners, to whom they had been awarded.

It cannot be necessary for me to impress upon you, Gentlemen, that the non-completion of an engagement so solemnly entered into with the whole republic of men of science, would have brought discredit not merely upon the Royal Society, but upon the personal honour of a Monarch of this country, whose name it is our especial duty as Fellows of the Royal Society, to hand down unsullied to posterity, as our munificent Patron and benefactor; and as no funds had been placed at the disposal of our Treasurer, nor in the hands of any other ostensible person to meet the very heavy expenses which must be incurred for cutting the dies and furnishing the Medals already awarded, I felt it to be my duty, when I succeeded to this Chair, to recommend to the Council the suspension of any further adjudgment of the Medals until I could have an opportunity of ascertaining the nature of the commands which had been issued concerning them by the late Sovereign through his official advisers or otherwise, and also of taking the pleasure of His present Majesty respecting their continuance in future, and the conditions to which they should be subject. These inquiries terminated in the most satisfactory manner. On a proper application to those who were intrusted with the ultimate arrangement of His late Majesty's affairs, prompt measures, as far as lay in their power, were adopted for the immediate fulfilment of every pledge which it was conceived had been given to the Royal Society and to the public at large in the name of George the Fourth.

The dies for the Medals upon the old foundation are now completed, and ready for distribution; they bear upon the one side the likeness of His late Majesty, while the reverse represents the celebrated statue of Sir Isaac Newton, which is placed in the chapel of Trinity College, Cambridge, with such emblematical accompaniments as seemed best calculated to indicate the magnificent objects of the researches and discoveries of that great philosopher, whose peculiar connexion with the Royal Society forms the most glorious circumstance in its annals.

After having settled that part of the business, and apprized the King of my success, I then ventured to petition His Majesty for the continuance of that protection and munificence which the Royal Society had ever experienced from His Illustrious Predecessors. The Sovereign, with that just and enlightened zeal for the promotion of every object allied with the honour and prosperity of this country, which as a loyal subject I acknowledge with gratitude, while as an affectionate brother I recognise it with pride, acceded at once to my request, accepted the charge devolved upon him by the demise of the late King, and ordered, in consequence, that a fresh die should be cut, and that his effigy should form the obverse side of the medal. This work also is completed. All the dies have been executed by Mr. Wyon with such boldness of outline, depth, and deli-

cacy of finish, as do him the highest credit: and I trust that the medals will be considered in every way worthy of the exalted rank and dignity of the Illustrious Personage in whose name this mark of Royal favour is intended to be conferred.

I am well aware that a diversity of opinion exists respecting the advantages which are likely to be conferred upon Science by a frequent distribution of medals. It is said that they must either confirm or contradict the judgement which has been either already pronounced, or which posterity will most certainly hereafter pronounce, upon the merits, pretensions, and influence of the discoveries or series of investigations which such medals are designed to commemorate: that in the first case they can confer no additional honour upon their author, whose rank has already been ascertained and fixed by the sentence of a higher tribunal, while, in the second, they can only tend to compromise the character of the scientific body by whose advice they are conferred. It is true that I would not claim infallibility for the united judgement of any association, or of any body of men, however eminent their scientific rank may be: but it is the peculiar privilege of the great masters of Science, (and more particularly so when acting or speaking as a body,) to be able to anticipate, though not without the possibility of error, the decision of Posterity, and thus to offer to the ardent cultivator of Science that highest reward of his labours, as an immediate and well assured possession, which he might otherwise be allowed silently and doubtingly to hope for, but never be permitted to see realized: and though some powerful minds might be content to entrust the complete developement of their fame to the fulness of time, and might pursue their silent labours under the influence of no other motives but such as are furnished by their love of truth, the gratification derived from the discovery of the beautiful relations of abstract science, or from the contemplation of the agency of a Divine Mind in the harmonies and constitution of the physical world, yet it is our duty and business to deal with men as we find them constituted, and to stimulate their exertions by presenting to their view honourable distinctions attainable by honourable means; to assure them that the result of their labours will neither pass unnoticed nor unrewarded; and that there exists a tribunal to which they may appeal, or before which they can appear, whose decision is always for honour, and never for condemnation.

It is for these reasons, Gentlemen, that I feel myself justified in expressing my opinion that the power possessed by your Council of conferring honorary rewards is a most salutary power, provided it be exercised boldly, impartially and diligently; and that it may greatly promote the taste for scientific pursuits in this country, by presenting a more immediate prospect than would otherwise exist, of a public and distinguished recognition of any valuable discovery, or of the completion of any important and laborious course of investigation.

I had occasion, Gentlemen, when I had last the honour of addressing you, to remark that there were many circumstances in the con-

stitution of society in England, and perhaps in the form and working of our Government, which were unfavourable to the cultivation of Science as a distinct and, as it were, a Professional employment. Though many of the causes of this evil, if so it may be considered, are too deeply seated to be reached by any legislative enactment, and though its existence may be the result of a system, the general effects of which are favourable to the interests and happiness of society at large, yet I think it is the duty of a wise Government to neglect no opportunity of promoting, by liberal encouragement, the developement of the intellectual as well as of the physical resources of a nation. Without venturing to give an opinion from this Chair, which it would ill become me to do, whether the various Administrators of the Government of this country, for more than a century past, have adequately fulfilled this duty, by animating individuals to the cultivation of Science by all the influence at their command, I rejoice and feel proud at finding myself at full liberty to give free utterance to the language of my feelings when speaking of the Royal Patron of the Royal Society, who has shown himself in this as in every other capacity, the Friend, the Protector, and the Promoter of whatever is dignified with the name and character of Science in this country. The King, Gentlemen, is the Fountain of Honour; and although His Majesty has been graciously pleased to authorize the President and Council of the Royal Society to act as his Official Advisers, in awarding his Royal Medals, he will not on that account regard them as less worthy of being considered as the immediate gifts of his Royal bounty, and as the honourable symbols of his Royal approbation.

It will be my first duty, Gentlemen, to distribute the Ten Royal Medals which have been already adjudged during the life-time of His late Majesty, to Philosophers who are amongst the most illustrious in this country or in Europe: they form a glorious commencement of a philosophical chivalry, under whose banners the greatest amongst us might feel proud to be enrolled; and though it may appear presumptuous in me to hope that a constant succession of associates can be found, either at home or abroad, who shall be considered worthy of being ranked with those noble Founders of this Order, yet I am confident that the Council of the Royal Society will feel an honourable pride in maintaining the character of the Body whose Members are to be constituted by their choice.

In proceeding now, therefore, to call your attention, Gentlemen, to the series of great men to whom those Medals have been awarded, I shall not presume to state in detail the specific grounds upon which the decisions of your Council were founded, but confine myself to little more than their enumeration in the order of time, feeling that it would be unbecoming in me to attempt to assign them those stations which they either have taken, or are destined hereafter to take, in the temple of fame.

The first name upon the list is that of Dr. John Dalton, a venerable Philosopher, whose developement of the Atomic Theory and other important labours and discoveries in physical science have, at the

eleventh hour, (I blush to own that it was not earlier,) first abroad, and secondly at home, secured him that public recognition of his scientific rank to which he has long been entitled. With him, Gentlemen, *posterity* may be said to have already commenced, and though full of years and honour, I rejoice to hear that he still retains the same zeal and vigour in the pursuits of science which have carried him forwards from his earliest youth in his career of discovery, in spite of all the discouragements of confined means and of the most laborious and depressing employments. It gives me great pleasure to learn that His Majesty has lately expressed his Royal approbation of his services to science by the grant of a pension, if not commensurate with his services, at least as considerable as the severity of existing regulations will allow; though I cannot refrain from expressing on this occasion my regret at the very narrow limits within which the munificence of the King and the generosity of the Nation should be confined.

The second Medal for the same year was awarded to Mr. Ivory, the first of our mathematicians who transplanted to this country the profound analytical science which LaGrange, Laplace, LeGendre, Gauss and others upon the continent, had applied to the most important and sublime physical inquiries. The dignity of such investigations has not suffered by the association of Mr. Ivory's name with them, and the Transactions of the Royal Society present frequent and honourable records of his valuable labours. It is, however, a gratifying circumstance to find that Mr. Ivory is no longer a solitary cultivator of these sublime sciences; but that an English School, of which he may be considered as the Father, is now rising, and must continue to rise, whilst it boasts of such masters as our Herschels and Airys, our Lubbocks and Hamiltons, and looks forward to such disciples as they are likely to form.

The Medal which was awarded to Sir Humphry Davy was a tribute of respect to that great Philosopher towards the conclusion of his labours. He had already retired from the Chair of the Royal Society, under the admonition of those infirmities which were destined too speedily to terminate his valuable life; and the Council availed themselves of the first opportunity of marking their sense of the honour which he had conferred upon his country by his brilliant electrochemical and other discoveries, by awarding to him, as a Fellow, that Medal which, from natural feelings of delicacy, they could not have offered to their President.

In the following year a similar tribute of gratitude and respect was paid to Dr. Wollaston, who had so long honoured the Royal Society by his services and his scientific contributions, and who, towards the close of his life, had augmented its means of usefulness by his liberality.

The fame of these two illustrious men is established upon too firm a basis to require or receive additional strength or permanence from any honours which we can pay to their memories; but there are some who were connected with them by the tenderest ties of kindred and affection, who are in part the depositories and inheritors of

their honours: these may cherish the possession of such monuments, as recording the reverence and respect of their contemporaries and fellow-labourers. To their hands, therefore, we commit them, as our last public offering to their memories. *Illi habeant secum, serventque sepulchro.*

The two other Medals for the corresponding years were awarded to two distinguished foreign Astronomers. The first, to Professor Struve, of Dorpat, who is so justly celebrated for his numerous and valuable observations of double stars,—a department of astronomy which is daily acquiring an increase of interest and importance, from the new and extensive views which it is beginning to open to us of the constitution of the remoter parts of the universe, and of the laws which seem to govern some at least of the periodical changes which they are undergoing. The second, to Professor Encke, of Berlin, the greatest of modern astronomical calculators, who first determined and predicted the motion of the comet which is justly signalized by his name, with an accuracy approaching to that which before belonged to the ephemerides of the planets only; and who still more has subjected the discrepancies between its tabulated and observed places to so accurate an analysis as to make them the foundation of the most novel and unexpected speculations respecting the existence of a resisting medium, which is capable of sensibly affecting the motions of those extraordinary bodies which obey the laws of gravity, at the same time that they seem to present few or none of those characters with which our notions of matter and substance are commonly associated.

The Medals for the years 1829 and 1830 were adjudged to Sir Charles Bell, to Professor Mitscherlich of Berlin, to Sir David Brewster, and to M. Balard of Montpellier.

To the first, for his elaborate experiments and discoveries relating to the nervous system, which place him in the highest rank of the physiologists and anatomists, not merely of this country, but of Europe.

To the second, for his theory of isomorphism, one of those great generalizations in the sciences of chemistry and crystallography which are reserved for men of large and extensive views, and which may be considered as constituting a great epoch in their history.

To the third, for his discoveries relating to the polarization of light, the most important laws of which he determined; forming one of those great series of experimental investigations relating to the properties of light and the optical properties of crystals which are unrivalled, since the time of Newton, for their variety, their delicacy, and perhaps also for their theoretical importance.

To the last, for a singularly successful and well developed example of chemical analysis, which terminated in the discovery of a new, and hitherto undecompounded body, Bromine.

I now come to the consideration of the Medals upon the Foundation of His present Majesty; and it is the King's pleasure that the President and Council of the Royal Society should be considered as his official advisers, in the award of an honour which emanates immediately from himself. His Majesty has also been graciously pleased

to prescribe the general Rules and Principles which shall regulate their distribution hereafter. The King has therefore commanded that they shall be adjudged annually, and that the award shall be announced on the day of the Anniversary Meeting of the Royal Society; that the Memoirs which shall be entitled to receive them, whether composed by Foreigners or by Englishmen, shall be communicated to the Royal Society; and that the *general* subject matter of such Memoirs shall be prescribed and announced by the Council at least three years preceding the day of their award: and also, that for the present and the two following years, the principle of their distribution shall be the same as that which has hitherto been adopted, with the additional condition, that the succession of branches of science which shall be selected as entitled to these rewards, shall be the same as that which shall be hereafter followed when the cycle of their regular distribution begins.

The selection of the subjects which should compose this cycle was left to the Council of the Royal Society, who have made such a choice as seemed to them best calculated to comprehend every department of science and to prevent the jealousies which might arise from the recurrence of similar subjects in immediate or too close succession: the subjects themselves and their periodical order (determined by lot) are as follow:—

1. Astronomy.
2. Physiology, including the Natural History of Organized Beings.
3. Geology and Mineralogy.
4. Physics.
5. Mathematics.
6. Chemistry.

In conformity with these Regulations, which form the existing law for the distribution of the Royal Medals, they have been awarded for the current year to Professor de Candolle, of Geneva, for his numerous and valuable researches and investigations in Vegetable Physiology, as detailed in his Work, entitled "Physiologie Végétale," published in the year 1832; and to Sir John Frederick William Herschel, for his Paper "On the Investigation of the Orbits of Revolving Double Stars," inserted in the Fifth Volume of the Memoirs of the Royal Astronomical Society.

The science of Vegetable Physiology has at all times presented extraordinary difficulties, and although it has employed the talents and the industry of a great number of philosophers, from the earliest period, little progress has been made in obtaining an exact knowledge of the minute organization of plants, and of the mode in which their functions are exercised, at least, when compared with the great advance which has taken place in the analogous sciences which relate to the comparative anatomy and physiology of animals.

The structure of vegetables, in consequence of its minuteness and intricacy, is involved in the greatest obscurity; its investigation requires the application of powerful microscopes, and is liable to all the fallacies peculiarly incident to such observations: and the greater part of vegetable physiology being dependent on the full and accurate

knowledge of that organization, is exposed to the same causes of uncertainty. But the progress of this department of science has suffered less from the want of accurate and sufficiently multiplied observations, than from the absence of a well-compacted and consistent theory to connect them together; and it was chiefly with a view to supply this great deficiency that the admirable work of Professor de Candolle was written, which has been selected by the Council as justly entitled to one of the Royal Medals. There is, in fact, no branch of botanical science which has not been greatly benefited by his valuable labours: his *Théorie Élémentaire de la Botanique* and his *Organographie Végétale* have made most important additions to our knowledge of descriptive botany, whilst in his *Physiologie Végétale*, by a most careful analysis and examination of the influence both of external and internal physical agents upon the organs of plants in the great functions of their nutrition and reproduction, by tracing them throughout the whole course of their operations, and by connecting their results with the well-known and well-established deductions of chemistry and other sciences, he has shown that he is also entitled to claim the rank and distinction of an inductive philosopher of a very high order.

The mention of the name of the second of these distinguished Philosophers to whom the Royal Medals for the present year have been adjudged, recalls my attention to the circumstances under which he has recently quitted his home and his country to pursue his labours in another hemisphere. He has devoted himself, as you well know, for many years at least, as much from filial piety as from inclination, to the examination of those remote regions of the universe into which his illustrious father first penetrated, and which he has transmitted to his son as an hereditary possession, with which the name of Herschel must be associated for all ages. He has subjected the whole sphere of the Heavens within his observation to a repeated and systematic scrutiny. He has determined the position, and described the character of the most remarkable of the nebulæ. He has observed and registered many thousand distances and angles of position of double stars; and has shown, from the comparison of his own with other observations, that many of them form systems whose variations of position are subject to invariable laws. He has succeeded, by a happy combination of graphical construction with numerical calculations, in determining the relative elements of the orbits which some of them describe round each other, and in forming tables of their motions; and he has thus demonstrated that the laws of gravitation, which are exhibited as it were in miniature in our own planetary system, prevail also in the most distant regions of space: a memorable conclusion, justly entitled, by the generality of its character, to be considered as forming an epoch in the history of astronomy, and presenting one of the most magnificent examples of the simplicity and universality of those fundamental laws of nature by which their Great Author has shown that He is the same to-day and for ever, here and everywhere.

A discovery like this, which we are this day called upon to commemorate, forms a noble, but I trust only temporary termination

to Sir John Herschel's European labours. He has long contemplated a voyage to the Cape of Good Hope, as a favourable station for observing the constellations of the Southern Hemisphere, and the magnificent nebulæ which it contains; and when we consider the space-penetrating power of his instruments, such as has never yet been brought to bear upon them; his skill and long experience and systematic diligence as an observer; his perfect familiarity with the class of phenomena which are to be observed; his sagacity in interpreting and disentangling the most complicated appearances; and his profound knowledge of physical as well as practical astronomy, we may look forward to a harvest of discoveries, such as will not only extend the existing boundaries of science, but add to the lustre of a name which is known and reverenced in every region to which European civilization has reached.

It has been said that distance of place confers the same privileges as distance of time, and I should gladly avail myself of the privilege which is thus afforded me by Sir John Herschel's separation from his country and friends, to express my admiration of his character, in stronger terms than I should otherwise venture to use; for the language of panegyric, however sincerely it may flow from the heart, might be mistaken for that of flattery, if it could not thus claim somewhat of an historical character: but his great attainments in almost every department of human knowledge, his fine powers as a philosophical writer, his great services and his distinguished devotion to science, the high principles which have regulated his conduct in every relation of life, and, above all, his engaging modesty, which is the crown of all his other virtues, presenting such a model of an accomplished philospher, as can rarely be found beyond the regions of fiction, demand abler pens than mine to describe them in adequate terms, however much inclined I might feel to undertake the task. That he may live to accomplish all the objects which have induced him to transport himself to another continent, and that he may long survive his return to witness the respect, reverence and gratitude of his countrymen, is my earnest prayer, in which I am quite sure that you, Gentlemen, will cordially join.

It now becomes my painful duty to call your attention to the names of those Fellows and Foreign Members whom the Royal Society has lost during the last year.

Sir John Malcolm was born in the year 1769, a year remarkably fertile in the production of great men *. He was one of a family of seventeen children, which enjoyed the singular distinction of having three of its members created Knights of the Bath in the same year. At the early age of thirteen he was sent to India as a Cadet, and learnt his first lessons of military service in the celebrated wars of the Mysore; and during an almost uninterrupted residence of nearly forty years, he was employed both in civil and military duties, frequently of great importance and difficulty, in almost every part of Central India; and it was chiefly owing to the opportunities afforded by this long intercourse with the natives of all classes and nations,

* Napoleon, Wellington, Cuvier, &c.

aided by the system of carefully recording his observations of their manners and customs, and by his perfect knowledge of their languages, that he was enabled to acquire the most intimate acquaintance with their habits, their feelings and their prejudices, at the same time that he secured, in a very uncommon degree, their confidence and respect by his strict impartiality, and by his considerate attention to their wants and their interests.

He was twice sent as Ambassador to Persia, where he conducted negotiations of great delicacy and difficulty in such a manner as to maintain the honour, at the same time that he secured the interests of the Government which he represented: he was, in fact, eminently qualified for the discharge of such a duty by his profound knowledge of the Persian language and literature, and by the conformity of his own manners with those of that lively and polished nation. Nor were the fruits of his mission political merely, inasmuch as they led to the production of his *History of Persia*, a work of great research and of standard value; to his *Persian Sketches*, so remarkable for their wit and vivacity, and, I believe, likewise for the truth of the pictures of manners which they furnish; and also to a volume of Poems, which display no inconsiderable powers of versification.

Sir John Malcolm was a voluminous writer, and amongst other works may be particularly mentioned his *Political History of the Government of India, from the year* 1784 *to the Present Time*; his very interesting *Sketch of the Sihks*, and his *History of Central India*. In all his writings he has shown himself to be the friend of the native population, and the zealous advocate of a system of government such as would reconcile the interests of the governed with those of the governors: and though he has very clearly demonstrated that our Indian Empire must be progressive in order to be permanent, and that external attacks upon it must not only be repelled, but the means of renewing them either greatly weakened or altogether removed, yet he stigmatizes with just reprobation the commencement or continuance of wars of conquest merely, which are not rendered necessary by previous and adequate provocation. Upon all such subjects Sir John Malcolm was eminently entitled to pronounce an authoritative opinion, from his great experience, both military and civil, and from his almost unequalled knowledge of the political interests and relations of all the various nations who compose or border upon our Indian Empire.

Sir John Malcolm returned to England in 1822: in 1827 he was appointed Governor of Bombay and Central India. He retained this important situation for three years, when he was recalled for the purpose of taking part in the discussions which were likely to arise upon the renewal of the East India Company's Charter. He was shortly after his return elected Member of Parliament for Launceston; but the questions which almost entirely absorbed the attention of Parliament and of the public at that period were not calculated for the favourable display of his peculiar powers. His last public address was made at a meeting in London in honour of his illustrious

countryman Sir Walter Scott, of whose genius and writings he was an enthusiastic admirer: on the following day he was attacked by paralysis, from which he never recovered; and he died at his house in London on the 31st day of May last.

Sir John Malcolm was tall and commanding in his person; his manners were remarkably free and unconstrained, and his conversation rapid and animated; and notwithstanding his long and intimate intercourse and association with Oriental people and Oriental languages and with scenes of life altogether different from those in which his earlier boyhood had been passed, yet he continued to speak with the accent of his countrymen, and to remember their national traditions with all the vividness and to recite their national poetry with all the enthusiasm, which characterize our earliest and deepest impressions. As a father, a husband and a brother he was eminently kind and affectionate; and few persons have been more generally beloved by their friends for their social virtues, or more respected and revered for their great talents and attainments and for their eminent public services.

I observe with pleasure that a monument, from the chisel of Mr. Chantrey, is to be erected to his memory in Westminster Abbey, for which ample funds have been provided by the almost spontaneous contributions of his friends; and it is worthy of remark that amongst the subscribers is to be found the name of an Eastern Potentate, the Pacha of Egypt, the founder of a great empire, and still more distinguished for his triumphs over Eastern prejudices, who became acquainted with Sir John Malcolm upon his return from Bombay, and who has most gladly availed himself of this opportunity of expressing his respect for the memory of his friend.

Mr. William Morgan was the author of several papers in our Transactions, chiefly upon the subject of the value of reversions contingent upon different cases of survivorship. For two of these papers, printed in 1788 and 1789, he received the Copley Medal. He was one of the first authors who rejected altogether the hypothesis of the equal decrements of life which had been introduced by De Moivre, partly from the want of correct tables, and partly for the purpose of simplifying the formulæ employed in the calculation of contingent reversions; and he showed in what manner such questions could be practically solved with reference to the real probabilities of life. Mr. Morgan was the nephew of the celebrated Dr. Price, whose memoirs he has written, and some of whose works he has edited; and he partook largely, at one period at least, of some of the political and financial opinions of that ardent character, particularly relating to the dangers of a national bankruptcy from the rapid increase of our National Debt. He was appointed early in life, chiefly by his uncle's influence and recommendation, to the situation of Actuary of the Equitable Assurance Company, which he continued to hold for nearly sixty years; and the unexampled wealth and prosperity of that great establishment may be in a great degree attributed to the confidence inspired by the correct principles of calculation and of management which he introduced: and though he

was exposed towards the close of life to many attacks and much opposition, in consequence of his too rigid adherence to a system which might be calculated to do injustice to some classes of insurers, yet no small indulgence is due even to the prejudices of a man who had done so much service to society, by establishing upon a firm basis the security of establishments which act as safeguards against the fluctuations and vicissitudes of life, and which thus encourage habits of providence and of foresight amongst the higher and middle classes of the community.

Mr. Thomas Allan, an eminent citizen of Edinburgh, was the author of a work on Mineralogical Nomenclature, and of several papers on geology and mineralogy in the Transactions of the Royal Society of Edinburgh, and elsewhere. He was greatly distinguished for his accurate knowledge of mineral species and their varieties, and of all the delicate and minute distinctions of external characters by which they are separated from each other; and his collection of minerals has been justly celebrated for its great extent and perfect arrangement. In the year 1812 he joined Sir George Steuart Mackenzie in an Excursion to the Faroe Islands, where he greatly enriched his collection, particularly in zeolites. This expedition was undertaken for the purpose of ascertaining whether, in a Trap Country, where no traces of *external* volcanoes existed, any thing similar to the peculiar features of the rocks of Iceland was to be found; and his Account of the Mineralogy of these Islands, in which his object has been to describe, without relation to theory, whatever appeared to him interesting in a geological point of view, was read before the Royal Society of Edinburgh in the beginning of the following year, and printed in the seventh volume of their Transactions. He adopted in early life the opinions of Dr. Hutton, though his papers on some points in geology in the neighbourhood of Edinburgh, and in the environs of Nice, show him to have been an accurate and an unprejudiced observer. He was a person of active habits and character, a liberal supporter of public charities and useful institutions, and an ardent and even enthusiastic friend of all the schemes for the improvement and decoration of his own magnificent and picturesque metropolis.

Dr. William Babington was a distinguished physician in the City of London. He was formerly a lecturer on materia medica and on chemistry at Guy's Hospital, and he was the author of a Systematic Arrangement of Minerals, founded upon a joint consideration of their chemical, physical and external characters; and also of other works, of less importance, upon mineralogical arrangement. He was the active and disinterested friend of science and of men of science, from the time of Priestley to that of Sir Humphry Davy; and though the absorbing duties of a laborious profession prevented his taking a leading part in original inquiries, he was well acquainted with the existing state of knowledge, particularly in geology, physiology and chemistry. He was one of the first founders of the Geological Society; and the earliest meetings of that distinguished body, which has contributed so powerfully to the advancement of geological know-

ledge, were held at his house. He was a person of great simplicity of manners, a warm and active friend, zealous in the promotion of objects of charity and usefulness, and in the practice of his profession singularly kind to the poor.

The death of Lord Dover in the course of this year excited an unusual degree of public sympathy and sorrow, from his youth and high birth, his domestic virtues, and perhaps also his domestic happiness, his unsullied public character, his cultivated taste for the arts, and his liberal and enlightened patronage of artists, and most of all from the promise of the highest literary distinction afforded by his very interesting historical memoirs and other literary productions. Such qualities and attainments, whilst they give dignity to all who possess them, acquire a peculiar grace and lustre when found in those classes of society in which the possession of rank and wealth separate altogether the pursuit of knowledge and of fame from all taint of a suspected union with the desire of mere personal aggrandizement.

The Rev. Bewick Bridge, Fellow of St. Peter's College, Cambridge, obtained the highest mathematical honours in his own academical year. He was for many years Mathematical Professor in the East India College at Haileybury, and was the author of several elementary works on different parts of mathematics, which are remarkable for their judicious adaptation to the capacities of ordinary students, by the union of simplicity and fulness in the developement of first principles,—a species of merit which those only can duly estimate whose experience in education has shown it to be very rarely attained. Mr. Bridge was a person of great benevolence, who devoted his life and fortune to the promotion of objects of charity and public utility, and whose purity of character and kindness of heart secured him the affectionate attachment of a large circle of friends.

Captain Lyon became first known to the public from his having accompanied the late Mr. Ritchie in his journey into the interior of Africa. His companion died at Moorzouk, and after encountering the ordinary succession of sufferings and dangers which characterize the melancholy records of African discovery, he succeeded in effecting his return, and published a very modest and interesting journal of his travels. He afterwards accompanied Captain Parry in the second voyage to the Arctic Regions, as commander of one of the two ships which composed that expedition. After his return he was chosen, from a knowledge of his enterprising and energetic character, to conduct a party of English miners to Zacatecas and Bolaños in Mexico, and to undertake the management of the first of these mining establishments: and though he continued there for a short time only, being compelled by domestic circumstances to return to England, his services were of such a kind as to produce the most important results. His Mexican adventures form a narrative full of interesting, amusing and instructive details. He was afterwards chosen by the Brazilian Company to superintend the celebrated gold mines at Gongo Soco, in the province of Minas Geraes, which under his management became so productive, as fully to vindicate and re-

deem the character of South American mining speculations. Upon quitting their service he engaged in mining adventures of his own; and it was in returning to England, in consequence of an accidental injury which he received in the course of his operations, that he died at sea, in the thirty-seventh year of his age.

Mr. Joshua Brookes was for more than forty years a distinguished teacher of anatomy, and it is said that during the course of his life he had superintended the anatomical education of more than seven thousand pupils. He had formed a Museum of human and comparative anatomy, which was second only in extent and value to the Hunterian Collection, and to which he gave the most ready and liberal access both to his pupils and to the public. To the completion of this museum, and to the instruction of his pupils, he devoted the whole of his time and of his income; and it was a melancholy circumstance that he should have been compelled towards the close of his life, when his health, and with it his sources of income were declining, from the pressure of pecuniary difficulties, to consent to the sale of his museum. The dispersion of this collection was to him a source of the most poignant distress; and the latter years of a long life which had been devoted with singular disinterestedness to the public service, were imbittered at once by the pressure of poverty and the despondency occasioned by the annihilation of those hopes of having raised a lasting monument to his fame, which had formed the great object of his ambition.

Lieutenant-Colonel John Baillie went to India as a Cadet in 1791, and from the commencement of his residence he devoted himself with great diligence to the study of the Oriental languages. Upon the establishment of the College of Fort William, in 1800, he was appointed Professor of the Arabic and Persian languages, and of the Muhammedan law, a situation which he continued to fill with great credit and distinction for several years. He was the author of *Tables elucidatory of a Course of Lectures on Arabic Grammar*, of *A Collection of the original Texts of the five most celebrated Grammars of the Arabic Language*, and of *A Translation from the Arabic of a Digest of the Muhammedan Law*, of which one volume only out of four was published. His Oriental studies appear to have terminated upon his appointment as Resident at Lucnow, where he continued for several years. He quitted India in 1818, and in 1823 he was appointed a Director of the East India Company. Colonel Baillie was one of the founders and most active supporters of the Royal Asiatic Society; and he represented his native town, Inverness, and its contributory burghs, in two successive Parliaments. His collection of Persian, Arabic, and other Oriental Manuscripts is said to have been one of the most extensive and valuable that was ever brought to this country.

Mr. Joseph Whidbey was for nearly fifty years a Master in the Navy, and had been one of the companions of Vancouver in his voyage round the world. He was a person of great practical knowledge and skill, and possessed of more than ordinary general attainments; and he was in consequence selected by the Government to

superintend, under the direction of the late Mr. Rennie, the execution of that great national work, the Breakwater at Plymouth. He was the author of three papers in our Transactions: one on the means adopted for raising the Dutch frigate Ambuscade, which had been sunk at the Nore; and the other two on certain fossil bones discovered in the limestone quarries at Oreston, near Plymouth.

Adrien Marie LeGendre, one of our Foreign Members, and one of the most illustrious analysts in Europe, was born in Paris in 1752, and died on the 10th of January last, in the eighty-first year of his age. After the completion of his studies at the Collège Mazarin, he devoted himself to mathematical and scientific pursuits, which he continued, with singular perseverance and industry, for the remainder of his life. At the age of thirty he gained the two prizes proposed by the Academies of Berlin and Paris; the one for a memoir on the motion of projectiles in a resisting medium, and the other for a memoir on the attraction of spheroids upon any external point whatever. It was this second memoir which gained him, in the following year, a place in the Academy, as the successor of D'Alembert, and which attracted in a peculiar degree the attention of mathematicians. The problem which it treated was one of the greatest importance and difficulty, particular cases only of which had been successfully treated by Newton, MacLaurin and Clairaut, but which he attacked in all its generality, and mastered its difficulties "sword in hand," to use the expressive language of Lagrange, when speaking of this admirable memoir. An important proposition discovered by Laplace led to a second, and a happy substitution, proposed and applied by Mr. Ivory, to a third resumption of this problem, which has finally terminated in such an organized system of approaching its difficulties, that it has lately been reduced to the order of those propositions which are included in the higher class of elementary books *.

It was in the course of his researches upon the attraction of spheroids that his attention was first drawn to the subject of elliptic integrals, concerning which his first memoir was published in 1786. He continued to pursue this most interesting and difficult branch of analysis in a succession of works, for a period of nearly forty years, and had finally collected his entire labours upon it in two volumes quarto, which he published in 1827, forming a vast treasure of analytical knowledge. He had hitherto laboured in this field without a colleague and without a rival, when two young analysts of singular genius and boldness, M. Abel, of Christiania in Norway, and M. Jacobi, of Königsberg, announced, almost simultaneously, the discovery of propositions which have led to an immense extension of this theory. LeGendre, with a nobleness of character which can only result from the most disinterested love of truth, was the first to welcome the appearance of these illustrious strangers upon his own territories, to make known the full importance of their discoveries, and to develope all their consequences; and although already arrived at an

* Poisson, (*Traité de Mécanique*, second edition,) who has obtained an expression for the attraction under a finite form.

extreme old age, he commenced and finished, with all the vigour and activity of youth, a third volume, expressly devoted to the discussion and classification of these *ultra-elliptic* functions, and to point out their analogy with, and relation to other classes of transcendents which he had himself already considered, or to which they would naturally lead.

M. LeGendre was the author of a justly celebrated treatise or essay on the Theory of Numbers, which first reduced the numerous and disconnected discoveries of Fermat, Euler and Lagrange to systematic order. He was the proper author, amongst many other discoveries, of the *law of reciprocity* between any two prime numbers, one of the most fertile and important in this theory, though its complete establishment was reserved for Gauss, whose work on this subject has gained him so just a reputation. Notwithstanding, however, the labours of these great men, this most important department of analysis still continues to be too much insulated, both in its form and its treatment, from the other branches of algebra, though much has been done to reunite them by the very valuable and original researches of that distinguished analyst M. Libri, of Florence, who has been recently naturalized in France, and who has succeeded M. LeGendre in his place in the Institute.

The work of M. LeGendre, on Geometry, has enjoyed a singular reputation, and has been most extensively used, particularly on the continent of Europe, in the business of education. It may be doubted, however, whether this work has altogether merited the high character which it has obtained: it has rather increased than cleared away the difficulties of the theory of parallels, which have so long embarrassed the admirers of ancient geometry and of the Elements of Euclid; and it has not succeeded, at least in any essential degree, in adding to the simplicity of the demonstrations, or to the clear and logical connexion and succession of the propositions of that unrivalled and unique elementary work, which has alone maintained its place amongst all civilized nations for more than two thousand years. It is proper, however, to observe that the notes appended to this work are full of valuable and original remarks, and are justly celebrated for the elegance of the demonstrations which they furnish of many important propositions.

M. LeGendre was the author of many other works and memoirs, containing many valuable series of investigations, and very important discoveries. He first attacked the great problem of the determination of the orbits of comets by general methods, which display all the resources of his analysis; though astronomers have not found it expedient to make use of his methods in the actual calculation of their elements, which is the only proper test of their practical value, though it may not be decisive of their theoretical perfection. He was the author of the method of *the least squares of the errors*, for the purpose of determining the most probable mean amongst the results of a great number of observations, of which such extensive use is now made in practical astronomy: a celebrated and most useful theorem

in geodesy goes by his name; and there are few departments of analysis or of dynamics which have not been benefited by his labours.

M. LeGendre was associated with Méchain and Cassini in the operations which were instituted in 1787, and finished in 1790, for the junction of the meridians of Paris and London. He was one of the three Members of the Council nominated for the purpose of introducing the new metrical system into France in 1795, and he constructed the formulæ employed for the calculation of the tables for the centesimal division of the quadrant. He was nominated, both during the Imperial and subsequent Government, to various public employments, chiefly, however, of an honorary nature, requiring no great sacrifice of time or attention,—a fortunate circumstance, when it is considered to what important labours the leisure of his long life appears to have been devoted.

The next name which I feel called upon to notice is that of Francisco de Borja Garção Stockler, Baron da Villa da Praia, a Lieutenant-General in the Portuguese army, and formerly Secretary of the Academy of Sciences of Lisbon: he was the author of several Papers in the Transactions of the Lisbon Academy, chiefly on subjects connected with the developement of functions, and also of a volume of Poems. In 1795 he published his *Methodo dos Limites*, and in 1824 his *Methodo inverso dos Limites*. In this latter work, written late in life, he adopted the opinions of the well-known Hoene de Wronski, which led to its rejection by the Academy of Lisbon, upon the report of two Academicians, when it was offered to them for publication. His works are not of a kind to exercise much influence upon the progress of science, and some of them are examples of the danger of dealing with formulæ of such great generality that their proper import and derivation are not very clearly understood by those who use them.

Of the five Foreign Members whose names appear in the lists of the additions which the Royal Society has received during the last year, it is with deep regret that I observe those of two of them also in the record of its losses: the first is that of Professor Meckel of Halle, the second that of M. Desfontaines of Paris.

Dr. John Frederick Meckel, Professor of Anatomy in the University of Halle, was the third member of a family singularly illustrious in the annals of physiological and anatomical science. His grandfather, at the beginning of the last century, was probably the greatest anatomist of his age, and was the founder of that collection which has become, by the additions of his son and of his grandson, the richest and the best arranged in Germany. His father was likewise an eminent anatomist, and greatly distinguished for his success in the practice of physic and of surgery, and for his general attainments. It was for the purpose of enriching the great collection which he inherited, and of completing those departments of it in which it was deficient, that young Meckel first directed his whole attention to comparative anatomy; but the results of his labours were not confined to his museum: he published a German translation of the Anatomie Comparée of Cuvier, which was enriched with many valu-

able notes. This was followed by his Contributions to Comparative Anatomy; by his *System der vergleichenden Anatomie*, which he did not live to complete; his *Tabulæ Anatomico-pathologicæ*; his *Handbuch der pathologischen Anatomie*; his work On Human Monsters, and several memoirs relating to this branch of medical science, which display a remarkable union of laborious research with the most profound and original views relating to the phenomena of animal life. He devoted a great portion of his time to the publication of the *Archiv für Anatomie und Physiologie*, one of the most valuable and instructive periodical publications on medical and physiological science which appeared in Germany. One of his last works, on the Lymphatic System, which is upon a magnificent scale, was dedicated to the celebrated Sömmerring, upon the completion of his fiftieth year from the period of his inauguration as Doctor in Medicine, as a tribute of respect to one who had been his own preceptor, the fellow-student of his father, the follower and pupil of his grandfather, the intimate friend of his family for three generations, and who was also one of the few of his living rivals in the sciences which he cultivated.

Meckel was only fifty years old at the time of his death: he united in a very remarkable degree the power of correct and philosophical generalization with the most profound and accurate knowledge of anatomical details; and though he may have left in his own country some who may equal or even surpass him in particular departments of human and comparative anatomy or physiology, there is no one of his countrymen, if, perhaps, Tiedemann be excepted, who can be considered as having made such important additions to our general views in those sciences.

René' Louiche Desfontaines, Professor of Botany at the Jardin du Roi, and one of the most distinguished botanists in Europe, was born at Tremblay in 1752. In the course of the years 1782 and 1783 he travelled, for the purpose of forming botanical collections, to the North of Africa, penetrating as far as the range of Mount Atlas; and his *Flora Atlantica*, which was published in 1798, a splendid and richly decorated work, contains the principal results of his labours. It was in the same year that his celebrated memoir on the Organization of Monocotyledonous Plants was read to the Institute, in which he demonstrated the different manners in which the ligneous fibres are developed in plants with simple and double cotyledons, and thus laid the foundation of two great and fundamental divisions in the vegetable kingdom *. He was the author of the *Tableau de l'École de Botanique du Muséum d'Histoire Naturelle*, of the *Histoire des Arbres et Arbrisseaux qui peuvent être cultivés en pleine terre sur le Sol de la France*, of a *Manuel de Cristallographie*, according to the system of Romé de l'Isle, of many elaborate articles in the Dictionnaire des Sciences Naturelles, and other similar publications;

* Traces of this distinction in the structure of Monocotyledonous and Dicotyledonous plants may be found in the writings of Grew, Malpighi, and Daubenton, though its full developement was reserved for M. Desfontaines.

and of a great number of Memoirs, chiefly in the Annales du Muséum d'Histoire Naturelle, which were for the most part descriptive of new genera and species of plants cultivated in the Jardin du Roi, the management of which had devolved upon him conjointly with MM. de Jussieu and Thouin.

M. Desfontaines was a person of mild and inoffensive manners, and perfectly free from those feelings of jealousy which tend to provoke either opposition or controversy. For a considerable period before his death he laboured under the affliction of total blindness, and was thus debarred from the continuation of those pursuits which had constituted at once the delight and the business of his life: and it was a fortunate circumstance that a visitation of Providence, which under ordinary circumstances would have produced a spirit of repining and discontent, was deprived of more than half its bitterness and severity by the spirit of contentment and resignation with which it was met.

At the conclusion of my Address to you, Gentlemen, last year, I felt called upon, at once by my subject and my feelings, to pass from the notice of the *certain* losses which the Society had sustained during the preceding year, to one which circumstances at that time rendered too probable. The long absence of Captain Ross and his companions, the perilous enterprise upon which they were engaged, the fearful alternative of shipwreck or famine which seemed their almost inevitable fate, had left few elements for hope, except in those who steadily trust in the unlimited resources of Providence to accomplish its ends, however remote and wonderful. I rejoice at the unlooked-for accomplishment of that hope, and I know that you, Gentlemen, one and all, will equally participate with me in these feelings. Captain Ross and his brave companions were "lost, and are found;" and I trust that the enthusiastic welcome which has met them upon their return will convince them that the heart of their country is that of a parent.

I forbear, Gentlemen, to mix up other topics with the expression of those feelings to which this happy event naturally gives rise, and however important may be the contributions to geography or to science which these perilous and painful adventures may have produced, I consider them, in the present condition of my feelings, but as dust in the balance, when compared with the knowledge of the important fact of the recovery of our long lost brethren.

Permit me then, Gentlemen, in your name as well as in my own, to offer to Captain Ross, whom I rejoice to see amongst us, our most cordial congratulations upon his happy return, and to express our hope that the sympathy and respect of his countrymen which he has already experienced, and which, I trust, he will retain for the remainder of his days, will form one of the best compensations for the long sufferings which he has endured, and for the incomplete success of an enterprise presenting difficulties from the certain operation of the laws of the physical world, which not merely baffle, but almost annihilate, the powers of the bravest, the strongest, and the most persevering of men.

The Secretary reported, on the part of the Council, that they had received an application from the Lords of the Treasury, for their opinion respecting the construction and mode of applying an instrument for ascertaining and charging the duty on spirits: in compliance with which they appointed a Committee to conduct the investigations required for that purpose. The Committee, after bestowing considerable labour and pains on this subject, agreed in a Report, which was adopted by the Council, and transmitted to the Lords of the Treasury, and for which they have received their thanks, for the labour and attention they have given to this subject. They have lately also received an intimation from the Treasury, that their further assistance will be requested to superintend, examine, and assist in the construction of the instruments and tables which will be required.

The Treasurer made the following statements with respect to the Number of Fellows, the State of the Finances, and the Receipts and Payments of the Society during the preceding year.

At the last Anniversary, the Society consisted of 748 Members; of whom there were,

11 Royal Personages,
45 Foreign Members, and
692 Home Members.

Since that date, there have died,

20 on the Home List, and
4 on the Foreign List,

and there have been admitted,

17 on the Home List, with
1 re-admission, and
5 on the Foreign List. Of whom
8 have compounded for life, and
10 have engaged to pay the Annnal Subscription of 4*l.*

The Society therefore now consists of,

11 Royal Personages,
46 Foreign Members, and
690 Home Members;

making a total of 747 Members; of whom

595 have compounded for life,
403 at the rate of 27*l.* 6*s.*
192 at the rate of 40*l.* 0*s.*
44 are subject to an annual payment of 2*l.* 12*s.*
51 are subject to an annual payment of 4*l.* 0*s.*

The DISBURSEMENTS of the Society may be classed under two heads:

1. Those which are *ordinary*; and
2. Those which are *extraordinary*, and not likely to recur.

The ordinary disbursements may be estimated in the following manner:

Salaries	£ 645
Lighting	80
Coals	40
Taxes	50
Charwoman and Servant	42
Postage	30
Fire Insurance	22
Miscellaneous	200
	£ 1109

The annual expense of printing the Philosophical Transactions has been, on an average of the last five years, £894, (without including the charges for stitching and for advertisements,) viz.

For Printing	£ 350
For Paper	259
For Engraving	285
	£ 894

These expenses attending their publication vary, of course, very much, according to the number of pages, the quantity of engravings, and the nature of the Papers, included in each volume.

Besides these ordinary disbursements, there is at present the expense of the Catalogue, which will probably cost the Society not less than £1000, including the expense of printing; and, for the present year, the cost of the Fluid-Lens Telescope (£157 10*s.*), and printing the Abstracts (£583 6*s.* 9*d.*), against the latter of which sum £141 18*s.* 6*d.* has been already received.

The INCOME of the Society is derived from

Rents	£ 284
Dividends on Stock	501
Quarterly and Weekly Contributions, about	270
Sale of Philosophical Transactions, about	350
	£ 1405

also whatever may be received from the Admission Fees or Compositions of new Members, which is fluctuating. The Admissions have been, on an average of the last five years, twenty-six, which would give of course £260 per annum for Admission Fees of £10 each; and the average number of Members who have compounded for Annual Contributions, during the same period, being twenty-one, the amount of Compositions at £40 each would be £840,—making a mean total of £1100 per annum for Admission Fees and Compositions. But it being now optional for Members to compound or not for Annual Payments, the Compositions (of which there have been only seven during the past year,) will most probably go on consider-

ably decreasing in number, or cease altogether: and until the amount of the present annual subscription of £4 is come into full operation, a temporary inconvenience will be experienced from this circumstance, as well as from the falling off in the Compositions [a].

Besides these sources of Income, there are other sums invested in the Funds; namely,

	£.	s.	d.	
The Fairchild Fund,	100	0	0	New South Sea Stock.
The Rumford Fund,	2161	0	10	Three per Cent. Consols.
The Donation Fund,	3820	19	3	Three per Cent. Consols.

of which the dividends are not applicable to the general expenses of the Society, but must be disposed of according to the intention of the respective donors.

The clear annual *Income*, therefore, which may for some time be expected,—without taking into consideration whatever may be received on account of the Admission Fees or Compositions of new Members,—may be considered as only £1400: and the probable annual amount of *Ordinary Expenses* as £2000 [b].

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[a] *Compositions and Purchases of Stock* (Minutes of Council, Dec. 5, 1833).

Compositions.—During the last twenty years, from November 30, 1813, to November 30, 1833, 463 Members have compounded for their Annual Contributions:—

	£.	s.	d.
257 at the original sum of £27 6s., making an amount of...	7016	2	0*
206 at the present sum of £40, making an amount of.....	8240	0	0

so that, during this period, £15,256 * have been received on account of Compositions for life. Of this sum, only £3915 have, during the same period, been invested in the purchase of Stock.

There are at present 595 Members who have compounded for Annual Payments; of whom 403 compounded at the rate of £27 6s., and 192 at that of £40.

Purchases of Stock (not including those on account of the Rumford or Donation Fund).—In 1813, the Funded Property of the Society, strictly so considered, was £11,361 13s. 4d. Stock, in the Three per Cent. Reduced Annuities. Since that date, (viz. during the last twenty years,) the following purchases have been made of the same kind of Stock:—

	£.	s.	d.		£.	s.	d.
In 1820 ...	2882	17	8	Stock, purchased for	2000	0	0
1821 ...	755	9	0	———	570	7	4
1829 ...				£1000 for £870 19s. 1d., of which one half was, a few months after, sold again at £459 7s. 6d., leaving only,	411	11	7
	500	0	0	Stock, purchased for			
1830 ...	1000	0	0	———	933	15	0
Total	£5138	6	8	———	£3915	14	0

	£.	s.	d.
Stock, Nov. 30, 1813	11,361	13	4
Do. purchased £. s. d. in 20 years... 5138 6 8			
Deduct sale..... 2500 0 0	2638	6	8
Stock, Nov. 30, 1833 ...	£14,000	0	0

[b] The average amount of annual expenses for the last twenty years is £2330.

* Corrected.

Statement of the Receipts and Payments of the Society between Nov. 30, 1832, and Nov. 30, 1833.

1. RECEIPTS.

	£.	s.	d.
Balance in the hands of the Treasurer at the last Audit....	536	16	1½
Weekly Contributions at one shilling.....	124	12	0
Quarterly Contributions at £1.....	158	15	6
Seventeen Admission Fees	170	0	0
Eight Compositions for Annual Payments	320	0	0

Rents:	£.	s.	d.			
One year's rent of estate at Mablethorpe: due at Michaelmas	107	0	0			
One year's rent of premises in Coleman-street: due at Michaelmas	95	0	0			
One year's rent of lands at Acton: due at Michaelmas	60	0	0			
One year's fee-farm rent of lands in Sussex; land-tax deducted: due at Michaelmas.....	19	4	0			
One-fifth of the clear rent of an estate at Lambeth Hill, from the Royal College of Physicians, in pursuance of Lady Sadleir's will: due at Midsummer ..	3	0	0			
				284	4	0
Dividends on Stock:						
One year's dividends on 16,500*l.* Reduced Annuities	495	0	0			
Pulteney Fund.						
One year's dividends on 200*l.* 3 per cent. Consols	6	0	0			
Fairchild Fund.						
One year's dividends on 100*l.* New South Sea Stock	3	0	0			
Rumford Fund.						
One year's dividends on 2161*l.* 0*s.* 10*d.* 3 per cent. Consols	64	16	8			
Donation Fund.						
One year's dividends on 3820*l.* 19*s.* 3*d.* 3 per cent. Consols.....	114	12	6			
				683	9	2
Carried forward				£2277	16	9½

	£.	s.	d.
Brought forward	2277	16	9½

Miscellaneous Receipts:

	£.	s.	d.
Sale of Philosophical Transactions ...	362	6	0
Sale of Abstracts of Papers	141	18	6
Sale of Sir H. Davy's Discourses	4	13	0
	508	17	6
Sale of £2500 Stock, 3 per cent. Reduced Annuities	2174	17	6
Total	£4961	11	9½

2. PAYMENTS.

	£.	s.	d.
Copley Medal.—Mr. Wyon: The value and striking of Six Copley Medals	32	2	0
Lady Sadleir's Legacy.—The Poor of the Parish, in pursuance of Lady Sadleir's Will.....	3	0	0
Bakerian Lecture.—S. H. Christie, Esq., for the Bakerian Lecture of 1833	4	0	0
Fairchild Lecture.—The Rev. J. J. Ellis for delivering the Fairchild Lecture of 1833	3	0	0
Rumford Medal.—Professor J. F. Daniell: Two years' Dividends on the Rumford Augmentation Fund; Nov. 30, 1832.	67	9	6
———— Mr. Wyon: The value and striking of a Gold and Silver Rumford Medal	64	0	0
Donation Fund.—The Trustees of the Arctic Land Expedition: One year's Dividends.....	113	12	0

Salaries:

	£.	s.	d.	£.	s.	d.
Dr. Roget, one year, as Secretary	105	0	0			
J. G. Children, Esq., one year, as Secretary	105	0	0			
Ditto for Index to Phil. Trans.	5	5	0			
C. Konig, Esq., one year, as Foreign Secretary	20	0	0			
Mr. Hudson, one year, as Assistant-Secretary	250	0	0			
Ditto, for Report on Medals and Lectures	21	0	0			
Mr. Roberton, one year, as Assistant to ditto	100	0	0			
Mr. Gould, one year, as Porter	60	0	0			
				666	5	0
Mr. Panizzi: On account; for preparing a Catalogue of the Library				150	0	0
Mr. Roberton: For assisting Mr. Panizzi: One year				54	12	0
Mr. Dessiou: For superintending the printing of Observations of the Tides.....				5	0	0
Mrs. Coppard: Gratuity				10	0	0
Fire Insurance, on the Society's Property.....				22	11	6
Carried forward				£1195	12	0

	£.	s.	d.	£.	s.	d.
Brought forward				1195	12	0
Bills:—						
Taylor:						
Printing the Phil. Trans., 1832, part 2 .	242	12	6			
Printing the Phil. Trans., 1833, part 1 .	134	10	8			
Printing and Paper for Abstracts of Papers in Phil. Trans., 1800–30, vol. i. and ii., in 4to and 8vo	583	6	9			
Printing and Paper of Proceedings, Nos. 11 and 12, and reprints of Nos. 1 to 10	80	15	0			
Printing of General Index to Phil. Trans. 1820–30	37	13	0			
Printing and Paper of Observations of Tides	38	11	0			
Miscellaneous Printing: Circulars, Lists of Fellows, Ballot-lists, Statement of Payments, President's Addresses, Minutes of Council, and for Advertisements	125	1	0			
Bowles and Gardiner:						
Paper for the Phil. Trans., 1833, part 1 .	110	5	0			
Paper for the Phil. Trans., 1833, part 2 .	227	10	0			
Paper for General Index to Phil. Trans. 1820–30	45	10	0			
Balance of former Account.....	5	5	0			
Basire:						
Engraving and Copper-plate printing for the Phil. Trans., 1833, part 1 ..	30	14	4			
Engraving and Copper-plate printing for the Phil. Trans. 1833, part 2 ..	233	6	0			
Engraving and Copper-plate printing of Circulars, Diplomas, &c.....	10	6	6			
Walkers:						
Engraving and Copper-plate printing for the Phil. Trans. 1833, part 1 ..	70	18	6			
Gyde:						
Sewing 1778 Parts of the Phil. Trans.	59	5	4			
Boarding 22 Parts of ditto, gilt	2	4	0			
Sewing 790 Parts of ditto, Index 1820–30.....	13	3	4			
Boarding 11 Parts of ditto	1	2	0			
Boarding 300 Sets of Abstracts, 2 vols. 8vo.....	20	0	0			
Boarding 200 ditto ditto, gilt	23	6	8			
Boarding 50 ditto ditto, 4to	9	3	4			
Boarding 50 ditto ditto, gilt	12	10	0			
Boarding 8 First and Second Indexes, gilt.....	1	0	0			
Carried forward	£2117	19	11	1195	12	0

		£.	s.	d.	£.	s.	d.
Bills :—	Brought forward	2117	19	11	1195	12	0
	Few & Co., Solicitors.....	10	1	6			
	Tuckett:						
	Bookbinding.....	24	14	0			
	Limbird:						
	Stationery and Stamps.....	58	7	3			
	Saunderson:						
	Shipping Expenses.....	25	11	5			
	Dollond:						
	A Fluid-lens Telescope	157	10	0			
	Arranging, engraving, and repairing instruments	20	0	0			
	Arnold and Johnson, Coal-merchants .	41	0	4			
	Brecknell and Turner:						
	Wax Lights, Candles, and Lamp Oil .	83	13	2			
	Skelton:						
	Cleaning Chandeliers; Candlesticks; Fire-guard; and repairing Lamps and Locks	23	14	6			
	Pryer and Spice:						
	Carpet-beating; Excise Box; Ladder; Plasterer's Work; Packing Cases.	31	15	0			
	Carr: Carpenter	3	18	11½			
	Caldecott:						
	Two moveable Book Stands	5	13	0			
	Cobbett and Son:						
	Window-cleaning and Glazing	8	10	6			
	Hornby & Co.:						
	Soap, large Mats, Brushes, Fire-Wood.	27	4	4			
	Illidge:						
	China for Library Tea.....	2	8	0			
					2642	1	10½
Books bought on account of the Money received from the British Museum :—							
	Baillière: Books,—on account	327	13	5			
	Simpkin and Marshall: Ditto	4	14	8			
	Bohn: Ditto	3	4	0			
	Maynard: Ditto	25	13	6			
	Rich: Ditto	1	12	0			
	Freight and Clearing	6	9	6			
					369	7	1
Parish Rates and Petty Charges:							
	Taxes and Parish Rates	49	8	9			
	L'Institut Journal: half a year	2	9	0			
	Postage and Carriage	27	10	3½			
	Extra Porterage and Delivery of 2250 Circulars	35	3	0½			
	Men in Libraries, removing books, &c..	10	16	10			
	Carried forward	£125	7	11	4207	0	11½

	£.	s.	d.	£.	s.	d.
Parish Rates and Petty Charges:						
Brought forward	125	7	11	4207	0	11½
Expenses on Foreign Packets and Presents	15	11	1			
Carriage of Cuvier's Bust	5	19	4			
Address to the King: engrossing and vellum	4	13	0			
Charwoman's Wages	12	12	0			
Board and Wages of Servant	30	0	0			
Miscellaneous expenses	16	18	4			
				211	1	8
			£	4418	2	7½
Balance in the hands of the Treasurer				543	9	2
			£	4961	11	9½

THE ROYAL SOCIETY IN ACCOUNT WITH THE BRITISH MUSEUM.

Dr.

	£.	s.	d.
To Cash received from the British Museum, on account of the Arundel Collection of Manuscripts, according to valuation	3559	3	0
	£ 3559	3	0

Cr.

By Cash on account of the following disbursements:—	£.	s.	d.
British Museum: Duplicate Books, valued at	450	0	0
——— Half the expenses of carriage of Ditto	0	15	0
Payne and Foss: Half the expense of valuation of Ditto	4	10	0
Sotheby and Son: Half the expenses of Sale of Duplicates belonging to the British Museum	194	5	4
Baillière: Books	2220	14	10
Simpkin and Marshall: Ditto	110	10	9
Wickens: Ditto	53	2	3
Maynard: Ditto	25	13	6
Bohn: Ditto	17	10	6
Deightons: Ditto	9	18	9
Sotheby and Son: Ditto	4	10	0
Davis and Dickson: Ditto	2	18	6
Rich: Ditto	3	10	3
Freight and clearing	75	1	7
Balance, Nov. 30, 1833	386	1	9
Outstanding:—			
Baillière: Books, 46 0 6			
£ 3559	3	0	

The Treasurer also reported, that no arrears of any kind remained unpaid, or due to the Society.

The Society next proceeded to the election of the Council and Officers for the ensuing year, when the following was declared to be the list:—

President: His Royal Highness the Duke of Sussex, K.G.—*Treasurer:* John William Lubbock, Esq., M.A.—*Secretaries:* Peter Mark Roget, M.D.; John George Children, Esq.—*Foreign Secretary:* Charles Konig, Esq.

Other Members of the Council: Francis Baily, Esq.; Peter Barlow, Esq.; William Thomas Brande, Esq.; Benjamin Collins Brodie, Esq.; Mark Isambard Brunel, Esq.; William Clift, Esq.; Rev. James Cumming; Michael Faraday, Esq.; Davies Gilbert, Esq.; George Bellas Greenough, Esq.; Rev. Philip Jennings, D.D.; Rev. George Peacock; William Hasledine Pepys, Esq.; Rev. Baden Powell; Rev. Adam Sedgwick; Captain William Henry Smyth, R.N.